

**WORKING
PAPER**



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INTERNATIONAL CIVIL AVIATION ORGANIZATION

SPECIAL COMMUNICATIONS/OPERATIONS DIVISIONAL MEETING (1995)

Montreal, 27 March to 7 April 1995

Agenda Item 1: Review of future demands for aids to precision approach and landing to support all weather operations

UNITED STATES IMPLEMENTATION PLANNING FOR CATEGORY I/II/III

(Presented by the United States)

SUMMARY

This paper presents future implementation plans for precision approach and landing systems in the United States. The Federal Aviation Administration (FAA) intends the wide area augmentation system (WAAS) to become the primary Category I precision approach aid in the United States. Current Category II/III instrument landing systems (ILS) will be sustained and new Category II/III qualifiers will be satisfied with ILS until Category II/III local area augmentation systems (LAAS) can be implemented. Category II/III ILS sustainment and expansion will be achieved by decommissioning individual Category I ILS installations, if necessary, for ILS radio frequency spectrum management. The United States has no plans to implement Category II/III microwave landing systems (MLS) while development of Category II/III GNSS solutions are being pursued.

1. INTRODUCTION

1.1 The demand for precision approaches in the United States is very high, particularly for Category I systems. Section 2 of this paper reviews the demand for this service and provides an implementation forecast. Section 3 discusses the implementation schedule and plans for specific technologies. Section 4 provides a summary.

2. IMPLEMENTATION FORECAST

2.1 Category I

2.1.1 Studies conducted by the United States indicate a potential demand for Category I service to over 8 000 runways in the United States through the year 2005. This is a significant increase over the current situation where precision approach service is provided to between 700 and 800

- 2 -

runways. For the purpose of this document, a runway is defined as any landing or take-off surface designated by a number.

2.1.2 The number of potential Category I runways was determined by identifying those runways in the United States with adequate length (at least 1 280 m (4 200 ft) long), surface, and lighting (runway edge lighting), to support Category I service.

2.1.3 Implementation of precision approach service at many of these runways has been delayed in the past because the benefit to cost ratio could not justify ground-based systems (i.e. ILS and MLS) at these locations. Furthermore, ILS localizer channelization constraints have prevented the United States from contemplating installations at some of these runways.

2.1.4 However, because of the low cost of GNSS and WAAS, benefit to cost ratio studies now qualify precision approach service at these runways. The United States also believes that adding precision approach service to many of these runways is highly desirable from a safety perspective.

2.2 Category II/III

2.2.1 The demand for Category II/III systems is not projected to rise as significantly as for Category I systems. The demand for Category II/III systems is expected to double to approximately 150 systems by the year 2005.

3. IMPLEMENTATION SCHEDULE AND PLANS

3.1 Category I WAAS

3.1.1 The United States is moving toward use of the WAAS accuracy component as the primary Category I precision approach aid in the United States. At present WAAS is in the acquisition phase. Activation of the accuracy component is planned beginning in late 1997, following evaluation of the most effective means of implementation.

3.1.2 As part of the plan, the initial WAAS is to be upgraded beginning in 1999. The initial WAAS will be upgraded through a series of four pre-planned product improvements (P³I) to achieve an "end-state" capability. By 1999, five geostationary satellites are expected to be added to the initial three geostationary satellites to provide dual satellite coverage throughout the contiguous United States (CONUS). Dual geostationary coverage is necessary to provide a high level of availability of service.

3.1.3 Certification of Category I augmented global positioning system (GPS) is planned to begin in 1997. Initially, ILS overlay procedures will be used to expedite operational certification for Category I. The approaches that will be certified in 1997 and 1998 will be at airports on the East and West coasts of the United States with dual geostationary satellite coverage by WAAS. By 1999 the United States plans to begin certifying approaches in the mid-continent. It is expected that by 2001 all of the Category I demand forecast can be satisfied with WAAS.

- 3 -

3.2 Category I ILS

3.2.1 The United States plans to sustain the vast majority of its current 759 Category I ILS systems until 2005. Most Category I ILS systems are expected to be phased out by 2010.

3.2.2 Prior to 2005, the United States may need to sustain some Category II/III ILS systems, or enable new qualifying Category II/III ILS systems, by selectively decommissioning some Category I ILS. (See paragraph 3.3.2 below.) A Category I ILS system will be considered a candidate for decommissioning if: 1) its frequencies are required in order to sustain an existing or enable a new Category II/III ILS system; and 2) Category I augmented GPS service can be provided for the runway in place of the Category I ILS service that will be lost.

3.3 Category II/III ILS

3.3.1 It is expected that Category II/III ILS can be sustained indefinitely in the United States. However, current plans also call for Category II/III ILS to be phased out by 2010.

3.3.2 Prior to 2010, new Category II/III qualifiers that have no FM broadcast interference or localizer channel availability problems will be able to be satisfied with Category II/III ILS. New or existing Category II/III ILS locations that have FM broadcast interference or localizer channel availability problems will have the problem resolved by selectively decommissioning a nearby Category I ILS system. This will make available an additional localizer channel for the Category II/III ILS.

3.4 Category I LAAS

3.4.1 The United States is currently studying the need for a Category I LAAS to enhance the availability of precision approach service at those airports that are heavily reliant upon Category I service.

3.5 Category II/III LAAS

3.5.1 The FAA is researching Category II/III LAAS as a successor to Category II/III ILS. Initial testing of a kinematic DGPS system shows a potential to meet accuracy requirements for Category III. Preliminary analyses indicate that continuity-of-service (COS) can be met as well.

3.5.2 When Category II/III LAAS is ready for commissioning, the initial United States plan is to limit dual equipage by installing Category II/III LAAS at new qualifying runways which do not currently have Category II/III ILS systems.

3.6 Microwave landing system

3.6.1 The United States has cancelled its funding MLS Category II/III development contracts. If MLS is required for Category II/III installations in the United States the equipment would be purchased on the open market. United States will continue to provide precision approach service to the international community using ILS until GNSS is standardized as the international system.

4. SUMMARY

4.1 The FAA is planning for augmented GPS to become the primary Category I precision approach aid in the United States.

4.2 To increase availability of Category I precision approach service, the United States plans to retain some ILS installations.

4.3 Some current Category II/III ILS will be sustained up until 2010.

4.4 Category II/III ILS sustainment will be achieved by decommissioning individual Category I ILS installations where necessary.

4.5 Research on Category II/III LAAS will continue in anticipation of its use as the replacement for ILS Category II/III.

4.6 The United States has no plans to implement Category II/III MLS while development of Category II/III GNSS solutions is being pursued.

5. ACTION BY THE MEETING

5.1 The meeting is invited to:

- a) endorse the transition to GNSS for Category I by States now; and
- b) endorse and support the world-wide development and use of GNSS for en-route and all categories of approach and landing.

CERTIFICATE OF SERVICE

I, Brent H. Weingardt, do hereby certify that a copy of the foregoing
Opposition Of Motorola To Petitions For Reconsideration has been sent,
via first class mail, postage prepaid, (or as otherwise indicated) on this 16th day of
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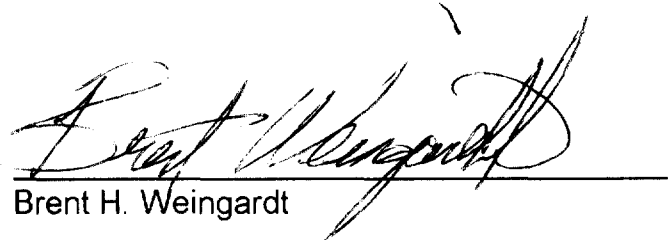
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